Annual Report

FOREST PEST CONDITIONS IN WISCONSIN

1966

WISCONSIN CONSERVATION DEPARTMENT

FOREST MANAGEMENT DIVISION

FOREST PESTS — SURVEY AND CONTROL

ANNUAL REPORT

FOREST PEST CONDITIONS

IN

WISCONSIN

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FOREWORD

The Annual Report of Forest Pest Conditions in Wisconsin is a compilation of numerous reports from many individuals. The Pest Control Section extends special thanks to field personnel of the Forest Management Division, and the many others who contributed to the pest survey and control effort during 1966.

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Forest Pest Survey and Control

FOREST PEST SURVEY AND CONTROL
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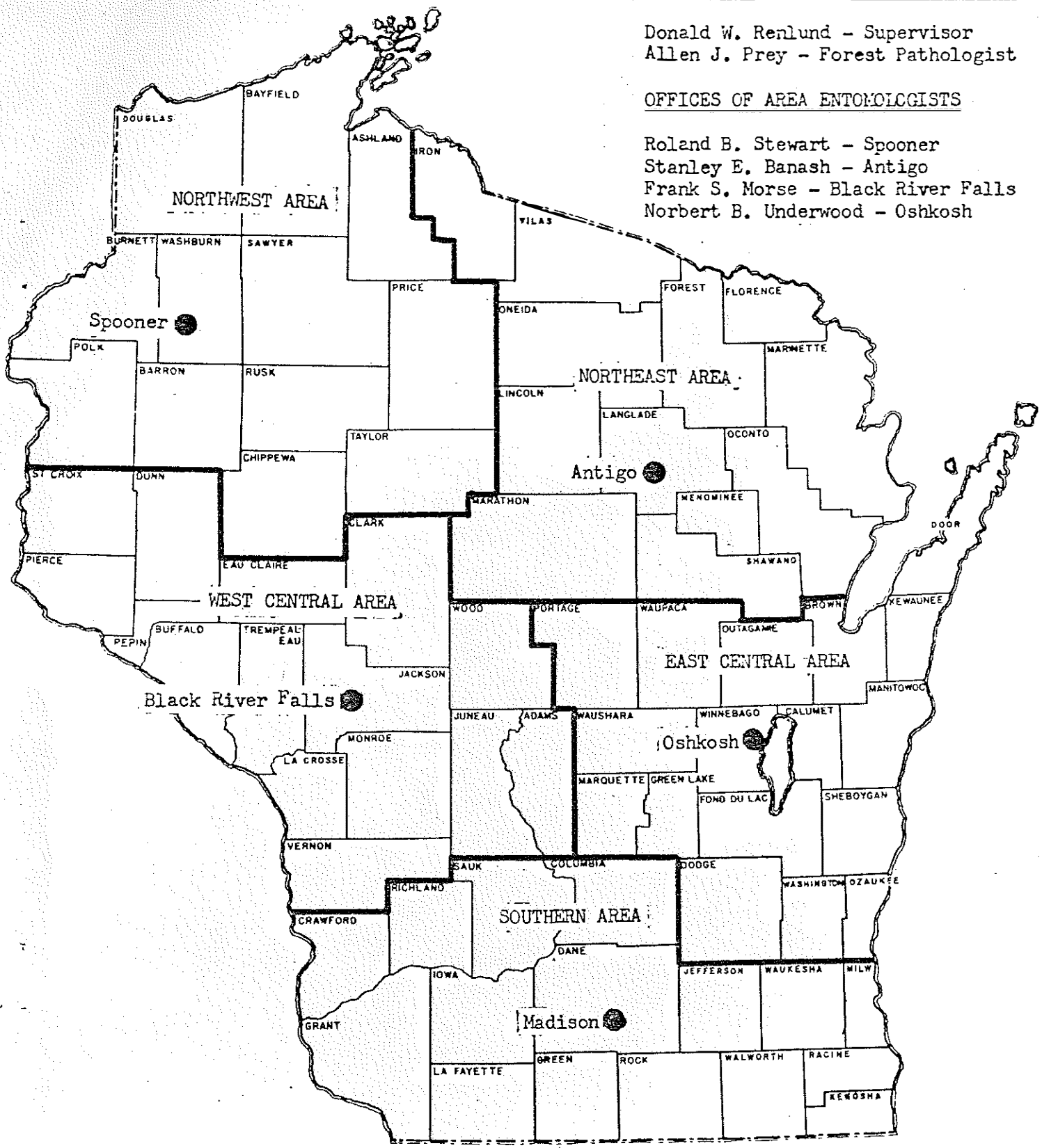


HIGHLIGHTS

A written policy establishing guidelines for use of pesticides on forest lands was the product of deliberations by representatives of all Department divisions.

The Pest Control Section was given the responsibility for control of nuisance pests in state forest and parks recreation areas. A study of nuisance mosquitoes was initiated in cooperation with the Entomology Department of the University.

The Department hosted the annual Central International Forest Insect and Disease Conference, in Madison, from October 13 - 15.

FOREST INSECTS

- Jack-pine budworm populations increased over much of northwest Wisconsin, especially in parts of Bayfield, Burnett, Douglas and Washburn Counties. An infestation north of Conover, in Vilas County, resulted in almost complete defoliation of 600 acres of jack pine. Lighter infestations occurred in Langlade, Marinette, Menominee, Oconto and Oneida Counties.

- Aerial application of three experimental chemicals as low volume concentrates did not provide adequate control of the jack-pine budworm.

- Pine tussock moth populations increased to light and moderate levels over a 12,000-acre area in Douglas County according to egg counts and evidence of feeding.

- Sucking insects were unusually active on a wide variety of hosts.

- Insecticide treatments were applied on 164 acres of pine plantations by mistblowers to control Saratoga spittlebug. Acreage treated was in Clark, Marinette, Oneida and Vilas Counties.

- Pine tortoise scale activity appeared to be increasing in the Northeast Area. Individual tree mortality was common on understory and open-grown trees in Marinette County. Scotch pine Christmas tree plantings in Langlade and Oneida Counties were severely attacked.

- Introduced pine sawfly defoliation was severe at scattered locations on shelterbelt and open grown trees from Black River Falls (Jackson County) westward and northward to Burnett and Washburn Counties.

- Zimmerman pine moth populations were high in red pine windbreaks and Scotch pine Christmas tree plantings along the Wisconsin River, near Boscobel in Grant County.

- Dieback of oak was common in the drier areas of Adams, Jackson and Wood Counties. Two-lined chestnut borer adults, Agrilus bilineatus (Weber), were recovered from Adams County wood samples. Similar dieback was observed in Dane and Menominee Counties.

- Approximately 400 acres of scrub oak were completely defoliated by walkingsticks in the town of Silver Cliff in Marinette County.

FOREST DISEASES

. A statewide survey of globose gall rusts of pine indicated that eastern gall rust was present throughout the range of jack pine in Wisconsin, while western gall rust was found only in the vicinity of Rhinelander in Oneida County.

. Annual trapping procedures for airborne Fomes annosus spores, conducted since 1963, have failed to yield the fungus. The 1966 statewide trapping project was started in October and continued through December.

. The Dutch elm disease problem in state parks was evaluated and suggested control measures were outlined.

. Early spring mortality of red pine seedlings at Hugo Sauer Nursery (Oneida County) was investigated.

. The fungus, Cylindrocarpon radicicola, was found in association with root-rotted black walnut seedlings at the Boscobel Nursery (Grant County).

. The significance of Scleroderris canker was studied in state nurseries and plantations.

. Several fungus diseases of pine Christmas trees were identified and development of the fungi studied.

. White pine foliage samples from Alma, Wisconsin (Buffalo County) showed evidence of sulfur dioxide injury.

POLICY ON PESTICIDE USE

(Adopted by the Wisconsin Conservation Commission - October 24, 1966)

Protection of the renewable but destructible resources of Wisconsin entrusted to the care of the Conservation Commission shall be accomplished in a manner which will provide maximum benefit to living plants and animals and their environment while permitting citizens of the State to safely utilize and enjoy that which is provided by nature.

Organisms living on or in our lands and waters occasionally become a nuisance to the general public or threaten the very existence of a resource. Remedial measures must then be considered and sometimes applied.

Pests are frequently controlled by nature. However, effectiveness of natural control, the consequences of man's intervention, or his failure to act, must be carefully weighed to assure protection of the resource.

When it is deemed necessary to apply control, priority will be given to nonchemical methods. Physical manipulation of habitat will be used where this approach to pest control is practical and can be applied without impairing desirable qualities of an area.

Use of chemicals may sometimes be the only practical way to forestall a disastrous pest situation. Chemicals can be effective and safe tools for combating pests if used wisely and with full awareness of their hazards and limitations. The potential for causing harmful or undesirable effects varies with the chemical and the manner in which it is used.

Where use of a chemical is found to be the only apparent solution to a specific pest problem, or is an essential part of a combination of control methods, the chemical of choice will be one which will adequately protect the resource with minimum damage to living things other than the target pest.

Use of degradable or nonpersistent chemicals, which will not accumulate in harmful form in living organisms or the environment, will be emphasized. If nondegradable or persistent chemicals are required, they will be used only under authority of a special permit issued by the Conservation Director. The permit will outline rigid control for each specific application.

Persistent chemicals, which by virtue of the manner in which they are used create no hazard to nontarget organisms, must be used judiciously until nonpersistent chemicals can be found to replace them. Their use will be discontinued when and where they produce undesirable side effects.

Combined approaches to pest control employing cultural, biological, mechanical, and chemical will be utilized to the extent that each is applicable to a specific pest situation.

MAJOR FOREST INSECTS

COLEOPTERA

Bronze Birch Borer - Agrilus anxius Gory

Tree and branch mortality were commonly observed in the vicinity of Spooner (Washburn County).

Bronze birch borers were also active in recently disturbed woodlands in the East Central Area where all but the birch trees had been removed.

Two-Lined Chestnut Borer - Agrilus bilineatus (Weber)

Mortality to jack oak (Quercus ellipsoidalis E. J. Hill) has been observed in Menominee County during the past three years. Aerial and ground surveys made in 1966 showed extensive branch and tree mortality in the southeast corner of the county, an area of light, sandy soil, on which the oak has been repeatedly defoliated by walkingsticks in alternate years over a long period of time. Damage to oak occurred on over 1,700 acres of oak-aspen-jack pine forest type in Sections 1, 2, 3, 9, 10, 11, 12, 13 and 14 of T28N, R16E. Borer larvae, tentatively identified as the two-lined chestnut borer, were found in all trees examined. The pattern of mortality correlates closely with previous walkingstick defoliation. Oak wilt as a factor in the mortality was ruled out because symptoms appeared much later in the season, and the fungus was not isolated from any of the samples from which cultures were made. (Map on page 5).

Similar damage was observed on dry sites in Adams, Clark, Eau Claire, Jackson, Monroe and Wood Counties in the West Central Area. Symptoms and damage were apparent in August on 1 percent of the trees in scattered locations, and up to 50 percent of the trees over large parts of Adams and southeastern Wood Counties. Damage in the West Central Area was most severe in areas affected by drought in 1963 and 1964, and by repeated defoliation by the oak grasshopper, Dendrotettix quercus (Packard). The damage was particularly evident along the paths of severe hailstorms which passed through Clark and Jackson Counties on June 20, 1964. Sample sections from Adams County trees produced numerous adult borers, tentatively identified as Agrilus bilineatus (Weber), 56 days after the winter-collected wood was moved into the greenhouse.

Black oaks were more heavily attacked than white oaks in Waushara and Marquette Counties, presumably by the same insect. Attacked trees had previously suffered from drought, wind damage, and late frost injury.

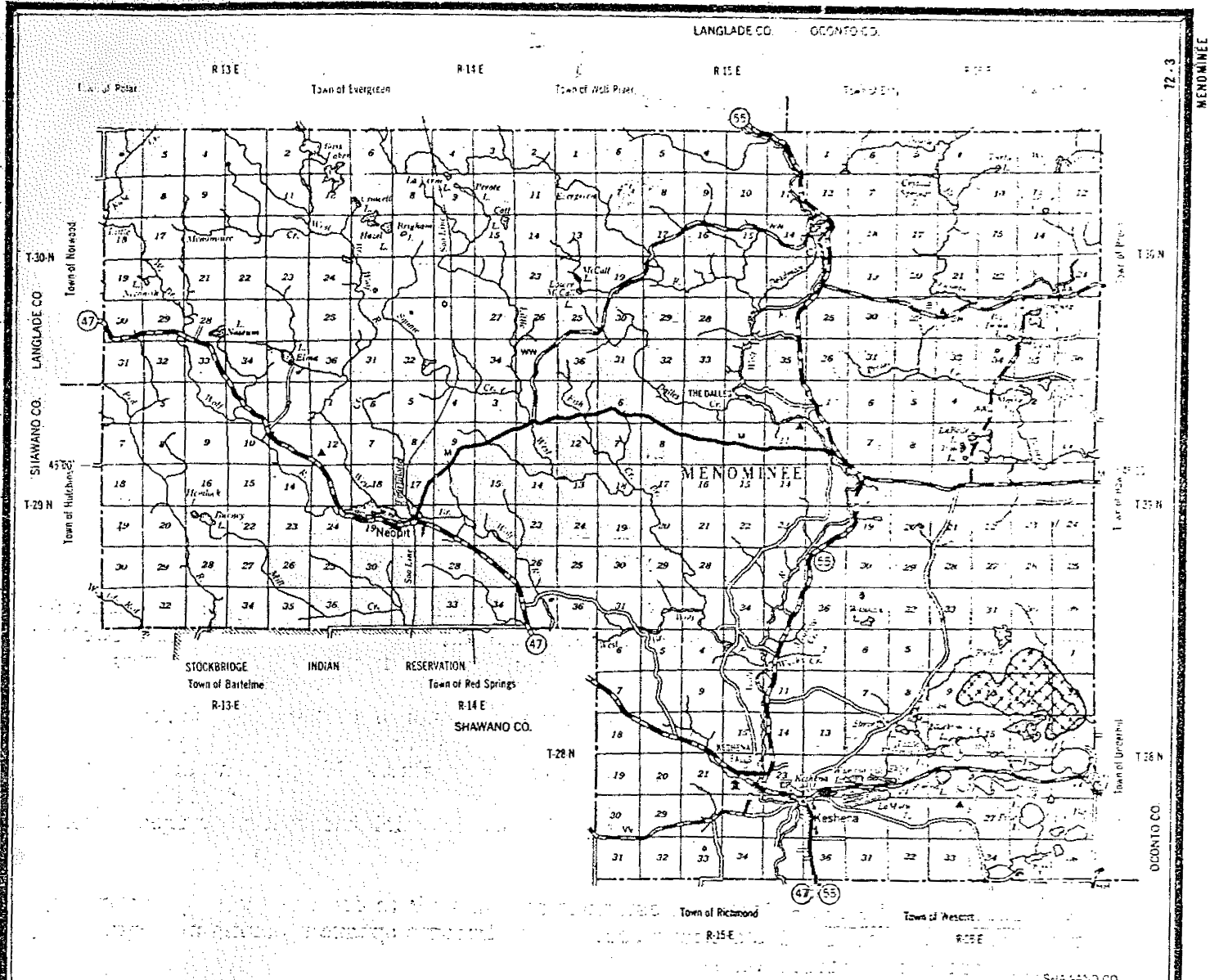
Strawberry Root Weevil - Brachyrhinus ovatus (Linnaeus)

Weevils were occasionally observed in Waushara County Scotch pine plantations during July. During the same period reports of the insects entering dwellings came from Washburn County (Spooner) in the northwest, and Dodge, Fond du Lac and Winnebago Counties in the East Central Area.

Wood Borers - Cerambycids

A 50-acre burned area in Burnett County was heavily attacked by Monochamus sp. following a fire on June 1.

Borers in the same genus were found in drought-killed pine trees in Waushara and Waupaca Counties. Mortality from drought was sparse in sapling and larger-size trees.



LEGEND

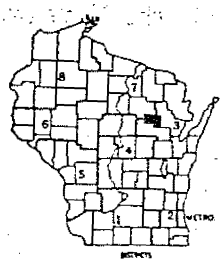
Port. Cement or Brick, Concrete — U.S. & STATE / COUNTY
Bituminous
Gravel
Earth
Town Road
Fire Lane
Railroad — Single / Double
R. R. Grade Cross
R. R. Above - Subway
R. R. Below - Overhead
R. R. Tunnel
Elect. Interurban
Dam
State Boundary
County Boundary
Civil Town Bound.
Corporate Limits
Nat. & State Reserves
U. S. Highway Number
State Highway Number
Seaplane Base
Airport

Fish Hatchery
Fair Grounds, Race Track
County Seat
Unincorporated Villages
Church, Religious Institution
Schoolhouse, Educational Inst.
Public Hunting or Fishing Grounds
Hospital
Cemetery
Forest Service Lookout Tower
Forest Ranger Station
Nat. Forest Pub. Camp & Picnic Gr.
State Nursery
Golf Course
State Park
County or City Park
Roadside Park
Institution
Wayside
Game Farm
Light House

OAK MORTALITY FALL 1966

Dieback Area

County Seat Keshena
Population 2,606
Area 361 Sq. Mi.



MENOMINEE CO.

STATE HIGHWAY COMMISSION OF WISCONSIN
STATE OFFICE BUILDING
Madison, Wisconsin
SCALE 0 1 2 MILES
Corrected to
JAN. 1964
Compiled from U.S.G.S. Quadrangles
Based on Aerial Photographs

MENOMINEE

Pales Weevil - Hylobius pales (Herbst)

Populations in the East and West Central Areas were much reduced compared to those of 1964. Fall feeding on Scotch pine in 1964 resulted in extensive twig and branch mortality in the spring of 1965. Generally lighter injury in 1966 may have been caused by reduced weevil activity due to late heavy rains in 1965, and dry summers in 1965 and 1966. Plantations treated with BHC for weevil control had very little damage.

Small patches of trees in two red pine plantations in Adams County were killed by pales weevils which had emerged from stumps of nearby pulpwood cuttings. Locations of the plantations were as follows: NWSW Section 28, T19N, R6E, and NESW Section 16, T17N, R7E.

Pine Root Collar Weevil - Hylobius radicis Buchanan

Northwest Area - No new infestations were reported in 1966. Tree mortality is still occurring in Scotch pine Christmas tree plantings. The older jack pine plantations which were heavily infested several years ago showed no new symptoms.

Northeast Area - Mostly red pine windbreaks were affected in Marathon, Marinette and Oconto Counties. Approximately 15 percent of the Scotch pine in a Shawano County Christmas tree plantation exhibited symptoms ranging from chlorosis to tree mortality.

West Central Area - The insect continued to be a major pest for Scotch pine Christmas tree growers. Heavy attacks were also noted in two red pine sapling stands. A 40-acre private plantation in La Crosse County was almost 100 percent infested, and a school forest planting in Dunn County was more than 90 percent infested. High winds tipped trees in both plantations disclosing infestations which had killed few trees until this year.

East Central Area - Recent infestations are difficult to detect except by disturbing the bases of trees. Old infestations continued to become apparent during prolonged dry periods and during strong winds.

Relatively new infestations, associated with red pine subject to drought conditions on high dry sites, were observed in Marquette, Waushara and Waupaca Counties. Where mortality occurred, it appeared to happen suddenly.

A variety of Scotch pine, French Green, seems to be better suited to conditions in the East Central Area, than other varieties, and in addition appears to be less susceptible to weevil attack.

Pine Root Weevil - Hylobius rhizophagus Millers

New infestations were not found in the Northwest Area, and little tree mortality was noted in areas of known infestation.

The root weevil continued to be the major forest insect pest in the West Central Area where it continued to destroy trees in several counties. The Black River State Forest, with over 2,000 acres of weevil-damaged plantations, has adjusted management practices to reduce weevil-inflicted losses. Approximately 150 acres of younger plantations were noncommercially thinned and 30 acres of older (29 years) plantations were commercially clearcut, yielding 4 to 5 cords per acre.

An increasing number of trees showed symptoms of attack, particularly in Marquette and Waushara Counties in the East Central Area. Symptoms were frequently associated with drought conditions, competition, and increased demands by the trees on sites.

Pine Bark Beetles - Ips sp.

Tree mortality from bark beetles was light in all areas, with only occasional loss of scattered trees. Late summer mortality of red pine, attributed to beetle attack, was noted in Monroe and Adams Counties where dry conditions had prevailed during midsummer.

White Grubs - Phyllophaga sp.

Little damage was reported in Northwest Area plantations. However, many reports of damage to lawns in the Spooner area (Washburn County), as well as to turf on the local golf course, indicated a very high population of grubs. The baseball field at Interstate Park (Polk County) was severely damaged by raccoons which were observed digging for grubs. It is expected that subsequent inspection of recent Northwest Area plantings will reveal considerable grub damage.

Defoliation by adult beetles was severe in parts of Oconto County, especially section 34, T31N, R17E. Aspen and scrub oak were most severely defoliated.

Less than 10 percent mortality was observed in scattered West Central Area plantings examined. No significant damage was reported.

A planting site in Manitowoc County in the East Central Area supported a large population of grubs, but apparently most feeding occurred on plants other than the tree seedlings. Elsewhere little damage was reported.

White-Pine Weevil - Pissodes strobi (Peck)

About 1 percent of the leaders were attacked in Northwest Area stands that were most severely infested, compared with essentially no weeviling in the same area in 1965.

Weevil populations were generally light in the Northeast Area, but a few white pine plantings had moderate infestations in Langlade, Marathon and Oneida Counties.

Populations were low in the East Central Area. Incidence of attack, while less than 1 percent, was highest and most successful on Norway spruce. Many larvae on white pine failed to complete development.

West Central Area populations were about the same as in 1964 and 1965, with infestations ranging up to 30 percent of the current leaders in heavily infested white pine plantations.

A light white-pine weevil attack was reported on red pine in Trempealeau County, a noteworthy fact, since damage to other than white pine is unusual in the West Central Area.

Insecticide evaluation plots for weevil control were established in Clark County Forest and Wildcat Mountain Park plantations. Methoxychlor and GC - 9160 (Allied Chemical Co.), compared with 0.5 percent lindane, were both as effective providing better than 99 percent control. equally

Approximately 24 acres of white pine plantings were treated in Wildcat Mountain Park with the insecticides mentioned, and about 73 acres were treated in the Clark County Forest. Of this acreage 45 acres were treated with lindane (0.5 percent) to which aroclor had been added. Twenty-eight acres were used for test plots which were treated with each of the insecticides mentioned above, with and without aroclor.

Phenological Note:

May 16 - New feeding punctures observed in Langlade County.

A Bark Beetle - Pityogenes hopkinsi Sw.

Drought-damaged white pine, trees in heavily thinned stands, and trees adjacent to white pine brush piles were most frequently attacked in the East Central Area. The insect appears to be an initial invader where trees have been attacked by blister rust. Attack is often followed by Ips beetles and Zimmerman pine moth when fruiting of the fungus occurs.

Hickory Bark Beetle - Scolytus quadrispinosus Say

The beetle was reported causing tree mortality in a woodlot near the city of Balsam Lake in Polk County.

Pissodes approximatus Hopkins

Incidence of attacks by the weevil was high in frost pockets and other poor sites where trees were examined for Scleroderris canker. Most dead and dying trees in frost pockets were attacked at the ground line, and up to a foot or more above it, along the main stem.

Infestations were found in plantations in Langlade, Marinette, Oneida and Vilas Counties.

Mature larvae and pupae were observed in frass-lined chambers on May 19 in Marinette County.

DIPTERA

Balsam Gall Midge - Dasineura balsamicola (Lintner)

Two severe infestations were noted in Langlade County and additional light populations were observed in Lincoln and Oneida Counties. Populations declined in several localities in the Northeast Area where they previously had been heavy.

Two attempts to control the midge with Thiodan (endosulfan), applied at a rate of 1/2 pound per acre, were unsuccessful. The applications were made in Langlade County the day following initial appearance of adults in field traps.

No infestations were reported from other areas.

Phenological Notes:

May 16 - Balsam buds, in unprotected areas, swelling. Aspen buds open and showing some green. A few minute, black Hymenopterons appeared in the midge traps.

May 20 - New growth on balsam about 1/8 inch long and 50 percent of buds were open. Adult gall midges were numerous in traps at Phlox (Langlade County).

May 24 - New shoots were 1/8" to 3/4" long. Adult stage of gall midge no longer appearing in traps.

Red Pine Needle Midge - Thecodiplosis piniresinosae Kearby

Midge populations were low, and only scattered twig mortality was noted in Douglas and Bayfield Counties. Little evidence of the insect or its activity was observed elsewhere in the state.

HEMIPTERA

Pine Spittlebug - Aphrophora parallela (Say)

Spittle masses were more numerous throughout the Northwest Area in 1966. The upper half of the trunks of many trees were covered with spittle in the township of Sterling in Polk County (T36N, R19W and T36N, R20W). This was the third year of heavy infestation for some stands in the Town of Sterling, but no mortality attributable to spittlebug has been noted.

High populations were generally observed on jack and Scotch pine in Northeast Area counties where heaviest infestations were noted in Langlade, Marinette, Oconto and Vilas Counties.

Spittle masses were infrequently observed in the East and West Central Areas on Scotch or jack pine, and spittle masses appeared to be adversely affected by hot, dry weather.

Phenological Notes:

June 1 - Spittlebugs were in the first nymphal stage in the Northeast Area.

June 4 - Most spittlebugs in the 4th nymphal stage in the Northeast Area.

June 21 - Adults first observed in Polk County.

July 13 - Adults observed in Langlade County.

Saratoga Spittlebug - Aphrophora saratogensis (Fitch)

Flagging due to Saratoga spittlebug feeding was not observed anywhere in the Northwest Area during the year. A small area of scarred trees was found in Waupaca County (East Central Area) during a Scleroderris canker survey, but since the localized problem resulted from poor growing conditions, and was not likely to be corrected by chemical control, none was recommended.

Two thousand acres of susceptible pine plantings were checked in the Northeast Area during June and July for nymphs. Infestations requiring chemical control included 49 acres in Marinette County, 65 acres in Oneida County, and 15 acres in Vilas County. Malathion in oil, applied with a backpack mistblower at a rate of 1/2 pound per acre, was successful in controlling the adult insects. Lighter infestations, not requiring chemical treatment, were noted in Langlade, Oconto and Marinette Counties.

Small areas of red pine plantings in Clark and Jackson Counties had high populations of the insect, and feeding scars indicated the same plantations had been infested in 1965. Thirty-five acres, in three Clark County forest plantations, were treated on July 21 with a Hurricane mistblower application of 3/4 pound per acre of malathion.

Phenological Notes:

June 14 - Most nymphs were in the 2nd instar in northeast counties.

July 12 - Both adults and nymphs were observed in Clark County.

July 18 - Approximately 70 percent of the spittlebugs were in the adult stage in northeast counties.

Eastern Spruce Gall Aphid - (Chermes abietis Linnaeus)

Crawlers were observed at the bases of Norway spruce buds in Winnebago County the first week in May.

Pine Needle Scale - Phenacaspis pinifoliae (Fitch)

Natural controls eliminated observed infestations that overwintered in the West Central Area, and no noticeable infestations were found during late summer.

Several infestations on white pine, Mugho pine, and spruce were reported in the East Central and Southern Areas, but treatment was required on only a few ornamentals.

Pine Bark Aphid - Pineus strobi (Hartig)

Populations were low in the state nurseries, and the insect presented no serious problems anywhere else in the state. A previously infested white pine planting near Delafield (Waukesha County) was almost entirely free of the insect, although trees surrounding a small opening in an adjacent planting had a whitewashed appearance from the waxy material exuded by the insects.

Pine Tortoise Scale - Toumeyella numismaticum (Pettit & McDaniel)

Infestations were limited to scattered jack pine or small groups of trees in Bayfield, Burnett, Douglas, Polk and Washburn Counties. Jack pine was also the principal host in Marinette County where individual tree mortality was common on understory and open grown trees up to 15' to 20' tall. Four to eight-foot Scotch pine ranging in age from 8 to 10 years were severely attacked in Langlade County (Section 17, T34N, R9E and Section 32, T33N, R11E) and Oconto County (Section 9, T26N, R20E).

Scattered Scotch pine Christmas trees were infested by the tortoise scale in Adams, Jackson and Wood County plantations, and the infestations declined somewhat during the summer.

Six Scotch pine in a mixed Christmas tree planting in Waushara County were the only trees, in the predominantly Scotch pine plantation, on which the insects had been successful in becoming established. Removal of the trees, all about 3 feet tall, was recommended, but the property manager chose to spray them instead.

Phenological Notes:

June 2 - Immature scales about 1/2 adult size in Marinette County.

June 15 - Scales mature, with eggs in Marinette County.

June 23 - Crawlers observed in Marinette County.

HYMENOPTERA

Introduced Pine Sawfly - Diprion similis (Hartig)

Spring populations were generally low in all areas. Later in the season larvae severely defoliated white pine windbreaks and isolated trees, along roadsides and in the open, at scattered locations from central Jackson County, near Hixton, northward into Barron, Polk and Burnett Counties. White pine windbreaks in Section 17, T38N, R11E, near Three Lakes (Oneida County) were also severely defoliated.

Less discernible defoliation was observed in Buffalo and Clark Counties.

Red-Headed Pine Sawfly - Neodiprion lecontei (Fitch)

A few scattered infestations were reported, mostly from the Northwest and Northeast Areas. Colonies were observed on roadside jack pine in Burnett and Washburn Counties. Most larvae had cocooned in Washburn County by August 22.

Although only scattered colonies were noted on red pine in Langlade, Oneida and other northeast counties, heavier infestations were found in two red pine plantings in Oconto County (Section 3, T30N, R17E) and Vilas County (Section 7, T43N, R8E). Trees were from 3' to 5' tall in the Oconto County plantation, and 90 percent of them had 3 to 5 colonies per tree. Trees in the Vilas County plantation were from 6' to 10' tall, and 60 percent of them were similarly infested.

A few defoliated pine branches were the only evidence of activity of this insect in the West Central Area, and three colonies were found in Waushara County (East Central Area) where larvae were mature on July 19.

Red Pine Sawfly - Neodiprion nanulus nanulus Schedl

A few colonies were reported on ornamentals in Shell Lake (Washburn County), and similar scattered light infestations were reported elsewhere in the state. Eclosion was first noted in Jackson County on May 20.

White Pine Sawfly - Neodiprion pinetum (Norton)

One report of defoliation was received from Buffalo County in the West Central Area. Several colonies were reported in Dodge County (East Central Area) in late September and early October. Defoliation of single isolated white pines and small groups of trees varied from light to almost complete at several locations in the Southern Area.

Jack Pine Sawfly - Neodiprion pratti banksianae Rohwer

Scattered colonies were found in parts of Bayfield and Douglas Counties in the Northwest Area, but serious defoliation was not observed.

Larch Sawfly - Pristiphora erichsonii (Hartig)

Defoliation by the larch sawfly was spotty throughout the Northwest Area. A few stands were severly defoliated while others were apparently untouched. An area in Section 21, T37N, R19W in Burnett County, and one in Section 27, T36N, R9W were severely defoliated. Some oviposition injury could be found in practically every stand, but destruction of a considerable number of cocoons by parasites and predators was noted.

The pattern of defoliation was similar in the Northeast Area with severe defoliation occurring in some stands in Forest, Langlade, Oconto and Oneida Counties. Sawflies were observed ovipositing on new shoots in Oconto County on June 23.

Light defoliation was observed in some West Central Area larch stands. Defoliation was estimated at 20 percent on a Jackson County plot and 40 percent on a Wood County plot.

Current oviposition damage was noted in Winnebago and Waupaca Counties, in the East Central Area, but no larvae were found and there was little evidence of defoliation.

LEPIDOPTERA

Maple leaf Roller - Acleris chalybeana (Fernald)

Maple Blight Associates - Leaf Rollers:

Acleris chalybeana (Fernald)
Sparganothis acerivorana (McKay)

Maple Webworm:

Tetralopha asperatella (Clem.)

Populations of A. chalybeana and T. asperatella declined to very low levels in Menominee County during 1966, and negligible defoliation occurred. Populations of S. acerivorana were also very light, and leaves rolled by this species dropped from the trees early in the season.

No significant populations of the insects were observed in other northeast hardwood areas with previous histories of infestation.

Cankerworms - Fall Cankerworm - Alsophila pometaria (Harris)
Spring Cankerworm - Paleacrita vernata (Peck)

An infestation was widespread in the Town of Leon in Waushara County (East Central Area). The principal host was black oak, most of which had been severely injured by late frosts. The population was less dense where late frost damage was most severe.

Large Aspen Tortrix - Archips conflictana (Walker)

Larvae could be found in most aspen stands in Ashland, Price, Rusk, Taylor and parts of Bayfield Counties, but no areas of severe defoliation were reported.

Little defoliation of aspen was noticeable in Clark and Wood Counties where it had occurred previously.

Jack-Pine Budworm - Choristoneura pinus (Freeman)

Budworm populations increased tremendously throughout most of the jack pine types in the Northwest Area. Serious defoliation occurred on 12,000 acres of timber in parts of Bayfield, Burnett and Douglas Counties. It was severe enough in some stands that top killing and tree mortality may be expected. Fall and winter cutting of timber were scheduled in many afflicted stands.

Populations declined in the Town of Sterling in Polk County, and in parts of Burnett County, where budworm populations had been high for at least two years previously. Most clumps of old jack pine (45 - 50+ years) were sold and cut in these areas during the winter of 1965 - 1966, leaving young vigorous stands. It is hoped that this type of silvicultural operation will be helpful in thwarting frequent damaging population increases.

A general buildup of budworm populations was also noted in several Northeast Area counties. The most serious infestation occurred in Vilas County (Sections 21, 22, 27, 28, T42N, R10E) on approximately 1,350 acres. Defoliation was almost complete on 600 acres of this area, and mortality was observed in some of the older jack pine, which appeared to be the center of the infestation. Trees within the infested area consisted of natural and planted trees ranging in age from young reproduction to trees approximately 45 years old.

Moderate budworm infestations were observed in natural and 25 to 30 year old jack pine plantings in Marinette, Menominee, Langlade, Oconto and Oneida Counties.

Pupal collections and egg mass surveys were made throughout the entire Northwest Area jack pine type during July and August. They indicated that populations may be expected to be higher and may cause serious defoliation over a gross area of about 80,000 acres in 1967. Suppression measures may be required on approximately 30,000 acres of this to prevent tree mortality and top killing.

Egg counts on the periphery of the Vilas County infestation averaged 20 masses per nine fifteen-inch branches indicating a potentially high population for the remaining jack pine in the locality.

Egg masses were scarce and defoliation was not apparent in West Central Area stands surveyed.

Control of the budworm with experimental chemicals was initiated in Bayfield County on June 29 in the continuing search for a replacement for DDT. Dibrom, malathion, and Thiodan were applied as low volume concentrate sprays by a Department-owned Piper Pawnee equipped for such work. Each chemical was applied at a single rate to three twenty-acre blocks of timber. Similar untreated blocks were used as a control for each of the treatments.

Spraying Systems diaphragm check valves with No. 80015 flat-fan spray tips were used to apply Dibrom 14 (Naled) and Malathion-Technical, each at rates of 8 fluid ounces of undiluted concentrate per acre. Thiodan 6 LV was applied at 12 fluid ounces of undiluted concentrate per acre. Applications were made under conditions usually considered to be ideal. Crystallization was noted in some of the Thiodan containers as the plane was being loaded, and although the total amount of crystals recovered from the containers was small, this may have affected the results obtained with the compound.

Prespray counts were made within 48 hours prior to treatment and postspray counts from 3 to 5 days following application.

A total of 20 evaluation plots were used on each of the malathion and Dibrom replicates, but time limitations permitted using only 10 plots on the Thiodan blocks. Sampling consisted of clipping 10 fifteen-inch twigs from at least 5 different trees at each plot, and recording the budworm larvae and pupae on each twig.

Adjustment was made for natural mortality. All the check blocks showed appreciable reduction in numbers between prespray and postspray counts, one dropping 22 percent, another 31 percent and the third 52 percent. This reduction was attributed mostly to turbulent thunderstorms which swept the area about 3 days following treatments.

Results of the test applications were as follows:

Legal Description	Material	Rate of Application/Acre	% Control
N1/2, Sec. 23, T46N, R9W	Malathion-Technical	8 fl. oz.	45.6
SE1/4SE1/4, Sec. 10, T45N, R9W SW1/4NW1/4, Sec. 11, T46N, R9W	Dibrom 14 (Naled)	8 fl. oz.	48.9
E1/2, Sec. 31, T45N, R9W	Thiodan 6 LV (Endosulfan)	12 fl. oz.	39.3

None of the materials provided a satisfactory degree of control at the rates used and under the conditions the applications were made.

Phenological Notes:

May 24 - First larvae observed in Polk and Burnett Counties. Leaders 4" to 6"; staminate flowers turning yellow.

May 26 - First larvae observed in Bayfield and Douglas Counties. Leaders 1" to 3", staminate flowers green and hard in Bayfield County; leaders 2" to 4" in Douglas County.

June 2 - Jack pine new growth 1" to 5" long in Vilas County.

June 7 - Larvae mostly 2nd instar; only a few 3rd instars in Douglas County.

June 8 - Larvae in Vilas County 70 percent 2nd instar, 30 percent in 3rd. Jack pine new growth 6" to 8" long; pollen shed in Douglas County.

June 15 - Larvae in Vilas County 60 percent 3rd instar, 40 percent 4th instar.

June 21 - Larvae mostly 4th instar in Polk and southern Burnett Counties.

June 24 - Larvae in 4th and 5th instars in Bayfield County.

June 27 - Larvae mostly 5th and 6th instars in Bayfield County. First pupa observed in Bayfield County.

July 7 - 65 percent of larvae pupated in Vilas County. Ravens observed feeding on budworm; crows also active in infested Vilas County jack pine.

July 11 - About 99 percent of larvae pupated; first moth observed in Bayfield County.

July 13 - Budworm moths numerous in Bayfield and Douglas Counties.

July 16 - Budworm moths numerous in Vilas County infestation area. Moths had emerged from about 60 percent of the pupae. No eggs found to date. Several mating pairs of moths observed.

July 20 - Moths emerged from 95 percent of pupae in Vilas County. Moths scarce in Wood and Adams County jack pine and little evidence of infestation.

July 25 - First eggs collected in Vilas County.

August 2 - Approximately 95 percent of budworm eggs hatched in Vilas County.

Pine Tussock Moth - Dasychira plagiata (Walker)

Tussock moth larval populations in the Northwest Area dropped drastically once more in the spring of 1966. Even in areas where fall feeding was evident and overwintering larvae appeared to be healthy as late as March, the majority of larvae failed to emerge from hibernation and start feeding. The cause of the larval mortality is not known.

Populations of larvae were so low that plans for testing insecticides in the field were canceled, and defoliation from spring feeding was hardly noticeable. Moths from surviving larvae produced high egg counts, over a somewhat larger area, resulting in light to moderate infestation covering approximately 12,000 acres in Douglas County (T43N, R11W; T45N, R10W and R11W).

Egg counts for 10 minute periods ranged from 0 to 3,188 per plot. Fifteen plots had counts of 800 or more eggs, 800 eggs being the standard set for a high population in the area. Some browning of vegetation resulted from fall feeding by larvae, and similar evidence of feeding was noted in Sections 28, 32, 33, T42N, R13W in Douglas County. The last mentioned area had an epidemic population in 1962 which collapsed from natural causes in 1963.

Present tussock moth populations are not expected to cause serious damage alone, but in combination with a rising budworm population could cause serious tree mortality in 1967.

Phenological Notes:

May 5 - First spring larval feeding noted.

May 25 - First Meteorus cocoon noted in Section 32, T44N, R11W.

June 9 - Most larvae in the 3rd instar.

July 5 - Most larvae in the 5th and 6th instars.

July 7 - First pupae found.

July 25 - First eggs noted.

July 29 - Major oviposition completed (90 percent +).

August 4 - First eggs hatching.

August 18 - Most eggs hatched.

August 30 - Most of larvae hibernating.

Zimmerman Pine Moth - Dioryctria zimmermani (Grote)

A few reports of infested Scotch pine Christmas trees were received from Jackson, Trempealeau and Wood Counties.

A heavy infestation occurred in the Wisconsin River Valley near Boscobel in Grant County. From 10 percent to 30 percent of the branch tips were infested in red pine windbreaks and Scotch pine Christmas tree plantings. A few pupae were found on July 14, and most larvae were in the last instar.

Jack Pine Shoot Borer - Eucosma sonomana Kearfott

Variable amounts of damage to Scotch pine Christmas trees were reported from Jackson, Juneau, Trempealeau and Wood Counties. Most of the borers were in the pupal stage in Section 2, T18N, R3E (Juneau County) on Scotch and jack pine hosts on May 17, and a few moths were observed.

Eastern Tent Caterpillar - Malacosoma americanum (Fabricius)

Few tents were reported except from the southeastern counties.

Forest Tent Caterpillar - Malacosoma disstria (Hbn.)

Annual egg mass surveys failed to reveal evidence of the insect in a Bayfield County locality where presumed defoliation by the caterpillar had been reported. Single mature larvae were found at three locations in Waupaca County. Two larvae were on red oak, and one on white ash.

ORTHOPTERA

Post Oak Locust - Dendrotettix quercus (Packard)

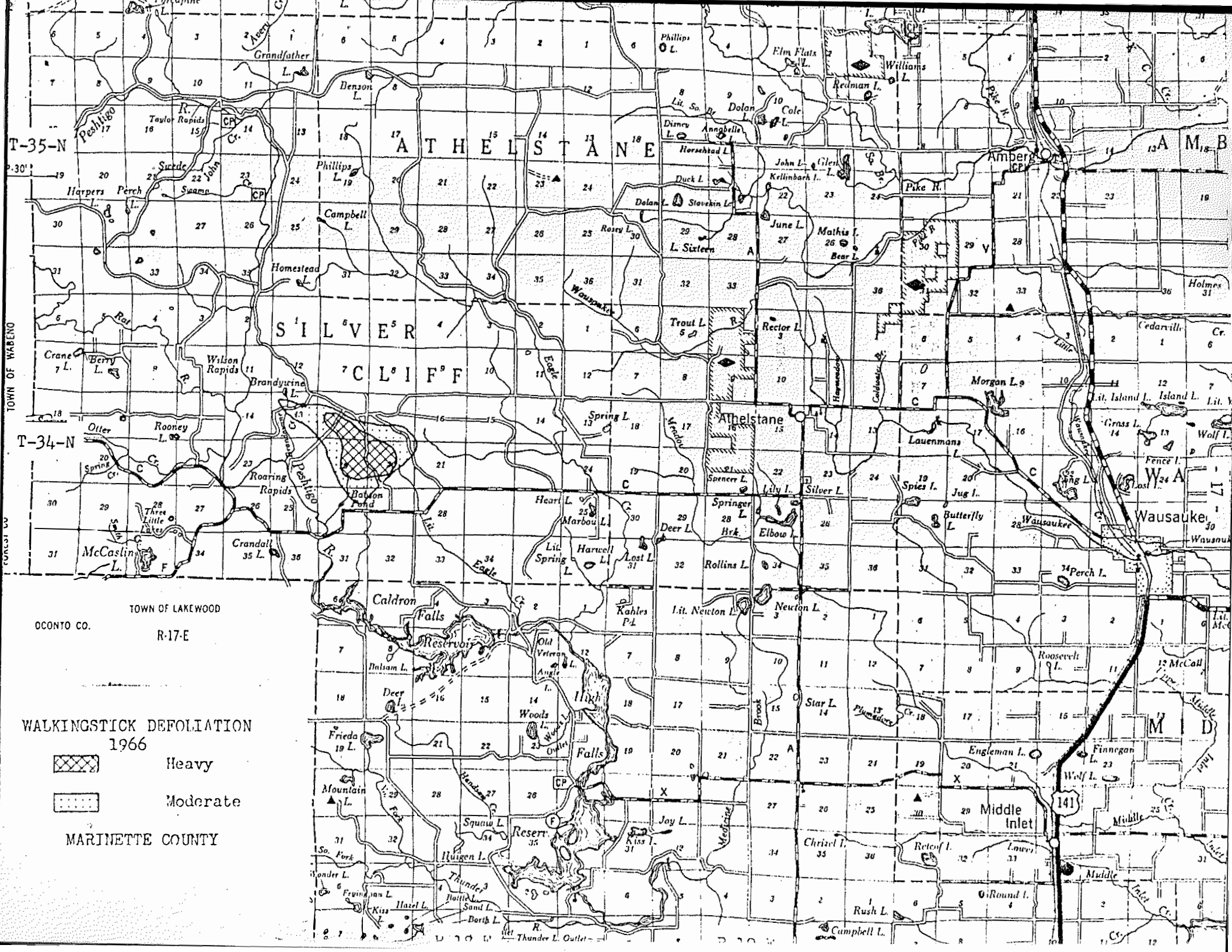
Noticeable defoliation by the grasshopper was not apparent anywhere during the season.

Walkingstick - Diapheromera femorata (Say)

Walkingsticks were found in most oak areas in Washburn, eastern Burnett and southern Douglas Counties in 1966. Defoliation was negligible in Sections 2 and 3, T40N, R13W, but adult walkingsticks were sufficiently plentiful to facilitate collecting.

Defoliation in the Eau Claire County Forest was very light where the amount of defoliation has been declining in even years since 1962. A nymph, 1-1/4 inches long, was found in the Coulee Experimental Forest (La Crosse County) on July 7 in Section 13, T16N, R6W.

Approximately 400 acres of scrub oak were completely defoliated in the Town of Silver Cliff (Marinette County). The infested area, including light to moderate defoliation, covered about 1,500 acres. Although oaks in this township have been defoliated to some extent every two years for many years, the acreage of heavy to complete defoliation has continued to decrease steadily. (Map on page 17).


T-35-N
T-34-N
ATHELSTANE
SILVER CLIFF
TOWN OF WABENO
TOWN OF LAKEWOOD
OCONTO CO.
R-17-E
Amberg
Athelstane
Wausaukee
Middle Inlet
Caldron Falls Reservoir
Peshtigo R.
Pike R.
Wausaukee R.
Eagle R.
Meadow Brook
Lit. Eagle Cr.
Spring Cr.
Grandfather L.
Phillips L.
Elm Flats L.
Williams L.
Redman L.
Dolan L.
Cole L.
Horsehead L.
Duck L.
Stovekin L.
Kellinbarh L.
June L.
Mathis L.
Bear L.
L. Sixteen
Campbell L.
Homestead L.
Rosey L.
Trout L.
Rector L.
Morgan L.
Lit. Island L.
Island L.
Gross L.
Wolf L.
Fence L.
Lauenmans L.
Spies L.
Jug L.
Butterfly L.
Spencer L.
Lily L.
Silver L.
Springer L.
Elbow L.
Spring L.
Marbou L.
Heart L.
Deer L.
Harwell L.
Lost L.
Rollins L.
Lit. Spring L.
Perch L.
Newton L.
Lit. Newton L.
Kahles Pd.
Old Veteran L.
Angle L.
Balsam L.
Deer L.
Woods L.
Frieda L.
Mountain L.
Squaw L.
Joy L.
Kiss L.
Huigen L.
Thunder L.
Bottle L.
Sand L.
Birch L.
Hazel L.
Kiss L.
Wonder L.
Frying Pan L.
So. Fork
Thunder L. Outlet
Star L.
Plumsteers Cr.
Engleman L.
Finnegan L.
Wolf L.
Roosevelt L.
McCall L.
Middle Inlet
Middle Inlet Cr.
Lower Inlet
Chriel L.
Retcof L.
Rush L.
Campbell L.
O'Round L.
Middle Inlet
Lit. Island L.
Fence L.
Long L.
Lost L.
Wausaukee
Wausaukee R.
Peshtigo R.
Brandywine L.
Wilson Rapids
Roaring Rapids
Three Little Lakes
Crandall L.
McCaslin L.
Rooney L.
Otter
Crane L.
Berry L.
Rat R.
Taylor Rapids
Swede
John
Swamp
Harpers L.
Perch L.
Benson L.
Grandfather L.
Abert Cr.
Disney L.
Annabelle
Dolan L.
Lit. So. Br.
Pike R.
Holmes
Cedarville
Cr.
Little
Caldonia Br.
Hayseadow
Meadow Brook
Lit.
Brook
Plumsteers Cr.
Middle
Inlet
Cr.
Outlet
Henderson Cr.
Lit. Fork
Medicine
Squaw L.
Reserv
Outlet
Falls
Mountain L.
Frieda L.
Deer
Balsam L.
Reservoir
Caldron Falls
Kahles Pd.
Lit. Newton L.
Newton L.
Perch L.
Rollins L.
Lost L.
Harwell L.
Lit. Spring L.
Heart L.
Marbou L.
Deer L.
Springer L.
Elbow L.
Spencer L.
Lily L.
Silver L.
Spies L.
Jug L.
Butterfly L.
Lauenmans L.
Morgan L.
Lit. Island L.
Island L.
Gross L.
Wolf L.
Fence L.
Long L.
Lost L.
Wausaukee
Wausaukee R.
Meadow Brook
Eagle R.
Peshtigo R.
Pike

Sampling for eggs in previous seasons indicated highest egg counts per unit of duff were from samples taken near the boles of infested oaks. Pairs of traps were placed on the ground under several trees in the infested area before oviposition started and left there until activity ceased in the fall. An area of complete defoliation produced an average of 81 eggs per square foot sampled under 8 trees. Counts ranged from 28 to 169 eggs per square foot during the oviposition period. Eight percent of the eggs were destroyed by parasitism in the sample with the highest count, while parasitized eggs averaged 3.5 percent in 16 samples from the area of complete defoliation.

Hot, dry weather in August and September appeared to be conducive to prolific and prolonged egg production. The area with high egg counts may expect severe defoliation again in 1968.

Phenological Notes:

June 7 - Most walkingsticks were in the first nymphal stage in Marinette County.

June 30 - Second nymphal stage predominant in Marinette County.

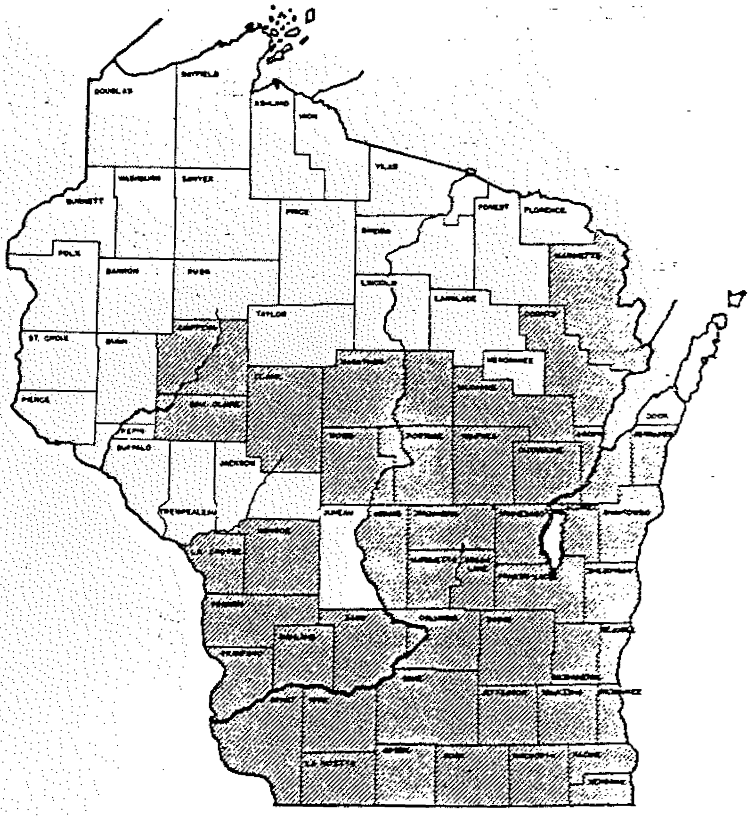
July 21 - Most walkingsticks in the last nymphal stage, some males mature in Marinette County.

MAJOR FOREST DISEASES

WILTS AND DIEBACKS

Dutch elm disease - Ceratocystis ulmi (Buisman) Moreau

Dutch elm disease has been reported in 44 of Wisconsin's 72 counties (see map below). New counties reported in 1966 were Chippewa, Eau Claire, Oconto, Shawano and Vernon.

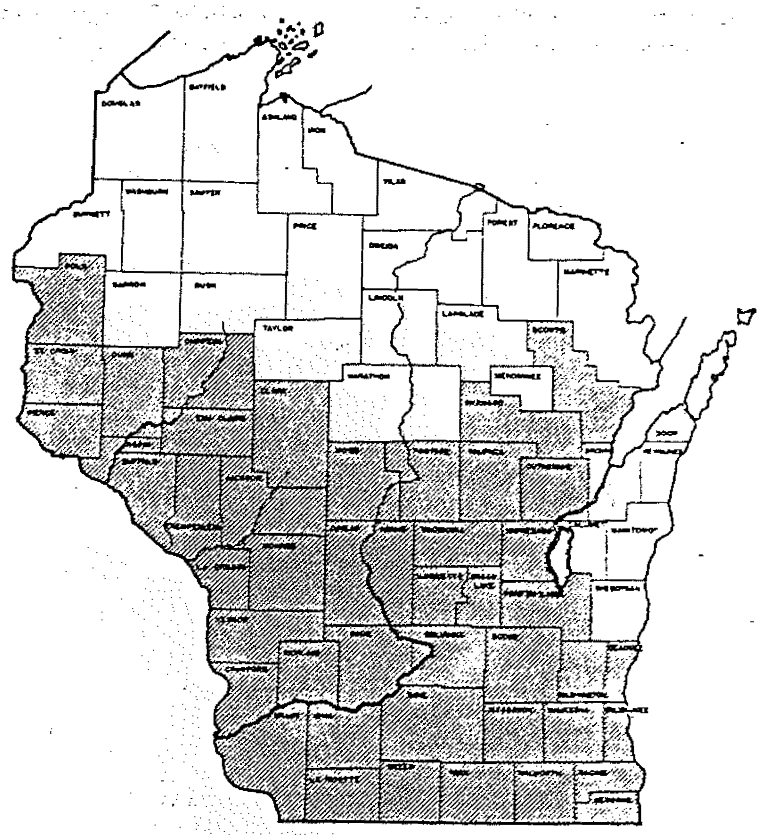


Known Distribution of
Dutch Elm Disease
1966

Oak Wilt - Ceratocystis fagacearum (Brentz) Hunt

There was no change in the county-wide distribution of oak wilt in Wisconsin during

1966. The disease is present in 46 of Wisconsin's 72 counties (see map below).



Known Distribution of
Oak Wilt
1966

ROOT ROTS

Annosus Root Rot - Fomes annosus (Fr.) Cke.

To date Fomes annosus root rot has not been found in Wisconsin. One means of detecting the fungus is by trapping spores in the air and culturing the fungus on discs, cut from young pine trunks, which act as a selective medium for the fungus. In 1963, pine discs were exposed weekly in each of the five survey areas from May through June and September through October for periods of 8-24 hours. Similar exposures were made in the spring and fall of 1964.

Modified sampling techniques were tried in 1965. One of these consisted of weekly collections of approximately 10 grams of pine foliage from each of the survey areas during May and June, and from September through November. Another consisted of exposing cheesecloth squares attached to a wooden frame at one location near Madison (Dane County) during the months October through January. Units of the two types of trapping surfaces were each washed in 100 ml of sterile distilled water, and 2 ml of the washings from each sample were pipetted on freshly cut red and white pine discs.

During 1966 pine foliage samples were collected from October 4 through November 29 in each area. Cheesecloth spore traps were exposed for 48 hour periods near Madison from October 19 through December 19. Additional samples were collected from spore traps attached to Forest Pest Control automobiles on several trips made in the months of November and December. The spore trap consisted of a double layer of cheesecloth placed between two layers of 16 mesh wire screen. The spore trap was then attached to the fresh air intake cowl on the hood of the automobile.

The pine foliage and cheesecloth spore traps were washed in 100 ml of sterile distilled water and 2 ml of wash water was pipetted on treated and untreated freshly cut red pine discs. The treated discs were dipped in a 1 percent solution of ortho-phenyl-phenol for one minute, removed and placed in sterile Petri dishes. The untreated red pine discs were put directly in sterile Petri dishes. All discs were incubated at room temperature for three weeks and were then examined with a binocular microscope for the presence of Fomes annosus.

Fomes annosus was not detected on any of the red pine discs. The fungus Peniophora gigantea was found frequently on both the ortho-phenyl-phenol treated and untreated discs. On the untreated discs there was abundant growth of Penicillium, Aspergillus, Trichoderma and miscellaneous staining organisms, while on the treated discs, there was limited growth of these same fungi.

STEM AND BRANCH DISEASES

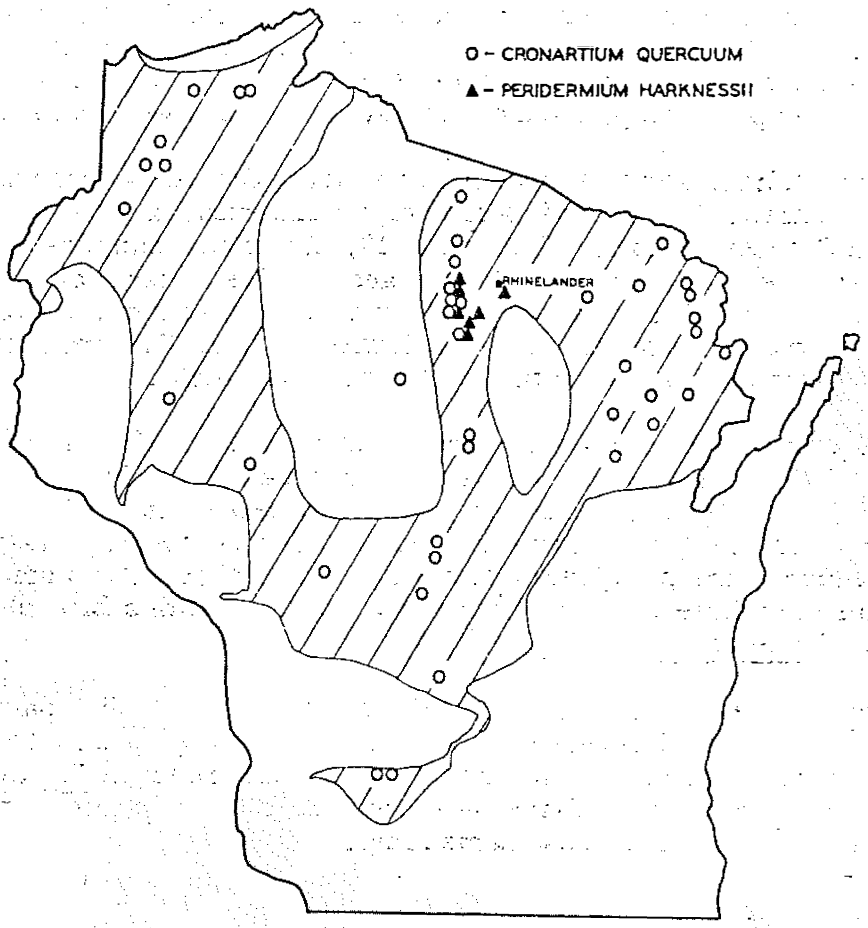
JACK PINE GALL RUST

Eastern Gall Rust - Cronartium quercuum (Berk.) Miyabe ex Shirai

Western Gall Rust - Cronartium coleosporioides Arth.
(Peridermium harknessii J. P. Moore)

A survey was made in the spring of 1966 to determine the distribution of globose gall rusts of jack pine in Wisconsin. An attempt was made to collect sporulating galls from jack pine in each county. A total of 112 collections were made. Thomas McGrath, Research Assistant, Department of Plant Pathology, University of Wisconsin, identified the collections. Germ tube measurements revealed 99 collections of eastern gall rust, (Cronartium quercuum; 3 collections of sweetfern rust, C. comptoniae; 2 collections of comandra rust, C. comandrae and 8 collections of western gall rust, C. coleosporioides (Peridermium harknessii). The western gall rust collections came from the Rhinelander area. A more intensive survey is planned for the coming year.

Survey results are portrayed on the map on page 22 .



Eastern Gall Rust - Cronartium quercuum

Western Gall Rust - Peridermium harknessii

Location of sample points, 1966, and species of rust found at each. Shaded area represents botanical range of jack pine in Wisconsin after P. O. Rudolf and R. L. Schoenike, 1963. (Map by T. McGrath)

Scleroderris pine canker - Scleroderris lagerbergii Gremmen (perfect stage)

Brunchorstia pinea (Karst.) v. Hohn. (imperfect stage)

Scleroderris pine canker was reported in Wisconsin in 1965 on the Chequamegon and Nicolet National Forests. In 1966, a total of 50 red and jack pine plantations from

two to ten years in age were surveyed on state and county forests in northern Wisconsin. Scleroderris pine canker was detected in five of the 50 plantations surveyed. Counties in which surveys were made included Bayfield, Douglas, Langlade, Marinette, Oconto, Oneida, Polk, Shawano, Vilas and Washburn. The disease was found in plantations in Bayfield, Douglas and Vilas Counties.

Dead lateral branches and basal stem cankers were present on both red and jack pine in the 45 plantations which were apparently free of Scleroderris pine canker. Frequently associated with these cankers were blue stain fungi, but the characteristic Scleroderris symptom of a yellow-green discoloration just under the bark was lacking.

Scleroderris was diagnosed in the field in the Douglas and Vilas County plantations. In the Bayfield County plantations symptomatic trees were collected and isolations were made from yellow-green discolored areas beneath the bark. The isolates were plated on malt and V-8 agar and were then incubated for 30 days at 34°F.

Occasionally fruiting bodies (apothecia) of Scleroderris lagerbergii were found on the bark of cankered red and jack pine trees. The imperfect stage (Brunchorstia pinea) was not observed in the field, but did develop in culture. Following is a summary of the 1966 Scleroderris Pine Canker Survey:

Plantations Surveyed - 50

Plantations with Scleroderris present -

PLANTATIONS WITH SCLERODERRIS PINE CANKER PRESENT

Location	Host	Diagnosis		Fruiting Bodies
		Field*	Laboratory Culture	(Apothecia)
1. Bayfield Co. NW1/4, Sec. 4 T49N, R5W	Red Pine (10 yrs. old)	+	+	+
	Jack Pine (7 yrs. old)	+	+	-
	Jack Pine (5 yrs. old)	+	+	-
	Jack Pine (5 yrs. old)	+	+	+
2. Bayfield Co. SESE, Sec. 35 T50N, R6W	Red Pine (5 yrs. old)	+	+	+
3. Douglas Co. Sec. 34 T46N, R11W	Red Pine (10 yrs. old)	+	-	-
4. Vilas Co. NWNW, Sec. 6 T40N, R10E	Red Pine	+	-	-
5. Vilas Co. SENE, Sec. 27 T41N, R11E	Red Pine	+	-	-

* Yellow-green discoloration
\+ Present
\- Absent

FOLIAGE DISEASES

Pine Needle Blight - Dothistroma pini Hulbray

Dothistroma pini was first reported in Wisconsin in 1963; hosts include Austrian pine (Pinus nigra), Mugho pine (Pinus mugho), and Ponderosa pine (Pinus ponderosa). Surveys made in 1964 indicate the disease was present in Wisconsin for some time and was well distributed on Austrian pine plantings in the central and southern areas of the state. The fungus has not been found to occur on red pine in Wisconsin.

In 1965 infected Austrian pine foliage was collected at weekly intervals throughout the growing season, from a plantation near Hixton, Wisconsin (Sec. 28, T22N, R5W). The needles collected in 1965 were embedded in paraffin, sectioned and stained at the Nevin Laboratory in 1966. The sections revealed that fruiting bodies (stromata) were well developed by April 28, 1965 and by May 5, spores (conidia) were found within the fruiting bodies. Spores were being discharged by May 28 and continued to be found within the fruiting bodies until August 30. Spores were lacking in collections made in September. The perfect stage, Scirrhia pini Funk and Parker was not detected on any of the collections.

A spray schedule for Wisconsin conditions was developed based on the 1965 Hixton collections and fungicide spray trials conducted by Glenn L. Peterson at the Rocky Mountain Forest Experiment Station at Lincoln, Nebraska. The spray schedule is as follows:

> Spray the needles with Bordeaux mixture (8-8-100) in mid-May. Apply the second application three weeks later. The first spray of Bordeaux mixture protects the previous seasons needles and the second spray protects the newly developing needles.

Brown Spot Needle Blight - Lecanosticta acicola (Thum) Syd.

Lecanosticta acicola (Thum) Syd., the conidial state of the brown spot needle fungus (Systremma acicola (Dearn.)) Wolf and Barbour, was first reported on Austrian pine in Wisconsin in 1943 by Berch Henry and Henry C. Greene at the University of Wisconsin.

An examination of the original L. acicola collection in the University of Wisconsin Herbarium indicated the fungus described as L. acicola was actually Dothistroma pini Hulbray. Also examined were University of Wisconsin Herbarium collections of L. acicola on Scotch pine collected by Robert F. Patton at Star Lake (Lot 5, Sec. 15, T41N, R8E) in Vilas County, Wisconsin in 1962. The L. acicola collections of Patton's were identical to L. acicola collections from Pinus taeda L. collected in Gainsville, Florida. Therefore, L. acicola is now recognized as the needle blighting fungus on Scotch pine and D. pini listed as the fungus attacking Austrian pine in Wisconsin.

In 1966 field collections of Lecanosticta acicola on Scotch pine were noted in Jackson County (NW1/4, SW1/4, Sec. 8, T21N, R5W) and in Dane County (NE1/4, NW1/4, Sec. 8, T6N, R6E). The recorded hosts of Lecanosticta acicola and Dothistroma pini in Wisconsin are as follows:

Disease	Host
Brown spot (Lecanosticta acicola)	Scotch pine
Pine needle blight (Dothistroma pini)	Austrian pine Ponderosa pine Mugho pine

L. acicola or D. pini were not found on jack pine, red pine or white pine in Wisconsin.

White Pine Needle Blight - Atmospheric Oxidants

White pine needle blight which is characterized by a reddish-brown discoloration of the needle tips has been found in scattered areas throughout the state. White pines in Bayfield County were affected as were white pine in Adams and Green Counties.

Disease intensity varied throughout the state. There were no indications as to why the disease was present in some areas and lacking in other areas.

Affected areas were often remote from known sources of air pollution such as automobile traffic or soft-coal-burning power stations. The damage may be caused by naturally occurring gases such as ozone.

An investigation was made of reported losses of 10,000 - 15,000 white pine seedlings planted in 1961. The trees were planted on a bluff about 2 miles north of Alma, Wisconsin (Buffalo County - NWSE, Sec. 35, T22N, R13W). Surviving white pines had reddish brown needle tips and were covered with soot indicating possible injury from combustion products emitted from a soft coal-burning power station located in the city of Alma.

NURSERY DISEASES

Black Walnut Seedling Root Rot - Cylindrocarpon radicicola Wr.

Cylindrocarpon radicicola Wr. was found in association with root-rotted black walnut seedlings at the State Forest Tree Nursery in Grant County near Boscobel, Wisconsin. The roots of diseased black walnut seedlings were discolored and spongy. Fruiting bodies (sporodochia) of C. radicicola were abundant on the surface of diseased roots. It is not known if C. radicicola is the primary agent involved in the walnut root rot or if it invades after damage by some other agent. John Hart, Assistant Professor at Michigan State University reported in 1965 that C. radicicola was isolated frequently from the roots of diseased oak seedlings in Michigan.

Cylindrocladium Root Rot - Cylindrocladium scoparium Morgan

Cylindrocladium root rot continues to be a problem in Wisconsin's forest tree nurseries, but modifications in fumigant application may minimize losses in the future.

Winter Injury

At Hugo Sauer Nursery in Oneida County near Rhinelander, Wisconsin, thousands of red pine seedlings turned red within a period of two weeks after the snow melted in the spring. The symptoms were typical of winter injury, but the reported outbreak of Jones Disease in the Forest Service Nursery at Watersmeet, Michigan prompted isolations for the fungus Scleroderris lagerbergii Gremmen. Further laboratory examination ruled out Scleroderris canker as an active pathogen in the Rhinelander Nursery.

OTHER PROBLEMS

Plantation Deterioration

In Waukesha County (SWSW, Sec. 30, T5N, R18E) a 30-year-old red pine plantation was found in a deteriorated condition. Many of the trees in the plantation had thin foliage, poor color, and reduced height growth. No bark beetle attacks were noted and the root systems were apparently free of root rot organisms. The plantation was established on a gravel moraine and soil tests indicated a pH of 7.8. The decline or deterioration observed in the Waukesha County plantation was similar to the plantation deterioration observed and reported in Iowa and Lafayette Counties in 1964.

MISCELLANEOUS

Drought conditions prevailed at times over much of the state during the growing season. Some plantation mortality occurred in the West Central Area and mortality to young balsam fir resulted in Waushara County from drought conditions. An especially hot dry spell, in the counties adjacent to the mutual boundary of the East and West Central Areas lasted from the last half of June through the early part of July.

A severe windstorm on July 10 flattened pine stands in the Hatfield vicinity (north central Jackson County) in adjoining parts of Clark and Jackson Counties. Elms and other ornamental trees were severely damaged throughout an extensive area. Damage from severe winds and tornadoes was widespread in Marquette and Waushara Counties and in parts of Waupaca County.

Frosts in May damaged emerging oak leaves in the East and West Central Areas.

Pines in widely scattered locations lost all but the current year's foliage.

Localized, heavy, wet snow in late March caused breakage and tipping of jack pine in parts of Eau Claire and northern Jackson Counties.

Weekly crop and weather reporting data indicated that seasonal rainfall accumulations for the period April through September, 1966 were below normal for all reporting districts. The Central District, consisting of counties on either side of the boundary between the East and West Central Areas, was 8.3 inches below normal for the period.

Some potholes, seeps and springs in the East Central Area were dry for the first time in at least 15 years.

Pine grosbeaks were unusually active on buds of red pine, jack pine, white pine and spruce across the northern tiers of counties from Green Bay to the west side of the state.

MEETINGS

Pest control personnel attended numerous local and national meetings, participated in in-service training sessions, and worked with educational institutions, and a variety of other groups during the course of the year.

The Department hosted the annual Central International Forest Insect and Disease Conference which was held at the Wisconsin Center in Madison from October 12 to 14. This meeting was attended by forest entomologists and forest pathologists from various points across the nation and the Canadian provinces of Manitoba and Ontario. People from many agencies in Madison contributed generously of time, talent, materials and facilities to the success of the affair. To all of them, thank you.

National meetings of professional societies and others included:

1. 58th Annual Meeting of the American Phytopathological Society in Denver, Colorado.
2. Entomological Society of America - Portland, Oregon.
3. National Academy of Sciences Research Council Symposium on Scientific Aspects of Pest Control - Washington, D. C.
4. Fourth National Christmas Tree Growers Convention - Stevens Point, Wisconsin.

Local meetings of importance to personnel were:

20th Annual Pesticide Conference with Industry - Madison

Third Annual Horticultural Industries Conference - Ames, Iowa

Third Annual Conference on Shade Trees - Madison

In addition to the above, personnel participated in numerous Department and interagency meetings which are essential for the functioning of the organization.

PESTICIDE RESIDUES

DDT residues in deer fat samples have declined each year in treated areas in Douglas County since the last application of the insecticide in 1964. Fourteen of 17 Douglas County samples were free of residue. Three deer had residues of 1.20, .64 and .19 parts per million in body fat. A Marquette County deer had 7.196 ppm in fat, and one from Waushara County had 1.12 ppm. Twenty-five other samples from Waushara County deer were free of residue, as were samples from 20 deer from Bayfield[3], Burnett[3], Clark[1], Jackson[3], Langlade[4], Marathon[1], Washburn[2] and Winnebago[3] Counties.

Residue analyses were made by the Pesticide Residue Laboratory of the General Laboratory Division, Wisconsin Department of Agriculture. The laboratory has contributed many man hours to this monitoring effort since it started in 1962 and their continuing cooperation is greatly appreciated.

CORRECTIONS

Annual Report

Forest Pest Conditions in Wisconsin - 1965:

Page 2 - Polyporus tomentosus, a root rotting fungus was found in the Crandall plantation in Adams County.

Page 24 - "...the level tolerated in the fat of beef by the Food and Drug Administration." "Of twenty-one samples taken from the same area...".

Page 25 - Waushara County should be shaded in on the map depicting known distribution of Dutch Elm Disease, 1965.

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